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EXAMINER	
LAI, ANDREW	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Continuation of PTOL-303 (Rev. 08-06)
(Form for Advisory Action Before the Filing of an Appeal Brief)

Response to Arguments

1. Applicant's arguments filed on 3/5/2008 (after final Office Action mailed to Applicant on 1/9/2008) have been fully considered but they are not persuasive.

Applicant's after-final argument is focused on the reading of prior art by Grover et al (US 2002/0071392, Grover hereinafter) on a particular claimed limitation of Applicant's claim 1, which states:

2) for each link, the sum of the working capacity and the restoration capacity shared by the set of one or more detour paths is, at most, a total capacity of the link

Further, Applicant relates this limitation to the following mathematical formulation:

$$\sum_{P:P \in P_e} f(P) \quad + \sum_{P:P \in P_f,\ e \in P} f(P) \quad \leq \quad u_e \qquad \text{(Applicant)}$$

On the other hand, said Examiner's final Office Action stated that Grover's constraints 2 and 5 together effectively discloses the above limitation, which Applicant does not agree (page 3 the paragraph starting with "While the Grover's constraint (2) ensures…").

In order to further demonstrate Examiner's position, some mathematical analysis appears to be necessary, which is presented below.

Grover's constraint 2 essentially is:

$$\sum_{P \in P^e} g^{e,p} \quad = \quad d^e$$

where d^e is the working capacity of an O-D pair e, or "number of demand units for O-D pair" and $g^{e,p}$ the "working capacity assigned to the p^{th} eligible working route for demand pair e" (see the table in [0020]).

Grover's constraint 5 essentially is:

$$\sum_{P \in P_i} \delta^P{}_{i,e} \cdot f^P{}_i \left(= \sum_{P \in P_e} f^P{}_e \right) \leq s_e$$

where s_e is the "number of spare capacity [restoration capacity in Applicant's term] placed on span e" and $f^P{}_e$ the "restoration flow assigned to p^{th} restoration route for span e" (same table in [0020]), noting that the equation in the parenthesis above holds because, as Grover disclosed, $\delta^P{}_{i,e} = 1$ (for $i = e$) or 0 (for $i \neq e$) (same table in [0020])

Also, Applicant is reminded that Grover requires both constraints be satisfied simultaneously. This fact leads to the following mathematical result, as a sum of constraints 2 and 5:

$$\sum_{P \in P^e} g^{e,p} + \sum_{P \in P_e} f^P{}_e \leq (d^e + s_e) \left(= u_e \text{ of the Applicant} \right) \qquad \text{(Grover)}$$

It is clearly shown that the above "Grover" formulation has its first and second $\sum$ terms reading on "Applicant" formulation's first and second $\sum$ terms, respectively; and also "Grover" formulation's $d^e + s_e$, as the sum of "working" plus "spare" capacities, yields the "Applicant" formulation's total capacity u_e.

2. Additionally, Applicant provided arguments in general terms regarding the difference of objectives between Applicant and Grover. Applicant argues (page 2 the paragraph starting with "In rejecting claim 1, ..."):

> "The problem that is addressed in Grover is a **network design problem**. The objective of the formulation is to design a network at minimum cost. There are **no capacity constraints** in the formulation. The objective function (constraint (1)) in Grover is merely the cost of designing the network. In contrast, in claim 1 of the present application, the Applicant assumes that the network is given, and the objective is to route the traffic. Since the network is specified, in particular, since the link capacities are given, **the routing has to respect these link capacities.** It is not possible to convert a linear network design problem into one with capacities. Therefore, there is no way that combining Grover's constraints (2) and (5) can possibly yield Applicant's constraints 2."

Examiner respectfully disagrees with these arguments.

First of all and in general terms, it is well known in the art that one of the foremost important issues in **network design** is optimizing the network capacities. In other words, it is inconceivable that a network design formulation would ignore this issue, although different approaches may incorporate different constraints, such as least cost.

Secondly, **network design** inevitably, and in fact most fundamentally, concerns optimized network **routing**, without which there would be no guarantee for realizing network capacities because network is comprised of communication routes. Therefore, network design has to be based on realistic/possible route configurations within certain limited capacities – no route would have unlimited capacities. This is natural, obvious, and of common sense to one skilled in the art. In this regard, network design will have to either rely on/reference to existing network data, or assume certain limits thereof based on reality. Either way will have to formulate the boundaries and constraints to design options, just the same as Applicant's "respect link capacities".

Thirdly, it is grossly incorrect to state "There are **no capacity constraints** in the formulation [of Grover]". Applicant is respectfully referred to Applicant's own statements on page 3, the paragraph starting with "While Grover's constraint (2)..." wherein Applicant correctly admitted and recited Grover's disclosure of constraints on "working capacity" and "spare capacity".

Lastly, while Grover is indeed formulating a "linear network design problem", Applicant is also resorting to the "linear programming problem" (LLP) (page 5 of the Specification third paragraph states "the three network constraints are formulated as a linear programming problem (LLP)"). Examiner fails to see why "it is not possible to convert a linear network design problem

into one with capacities", while Applicant can use linear programming to handle capacities. And, again, as stated above and admitted by the Applicant, Grover has well established his formulation with constraints that handle link/route/network capacity issues at various levels.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW LAI whose telephone number is (571)272-9741. The examiner can normally be reached on M-F 7:30-5:00 EST, Off alternative Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on 571-272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Andrew Lai/
Examiner, Art Unit 2616
3/18/2008